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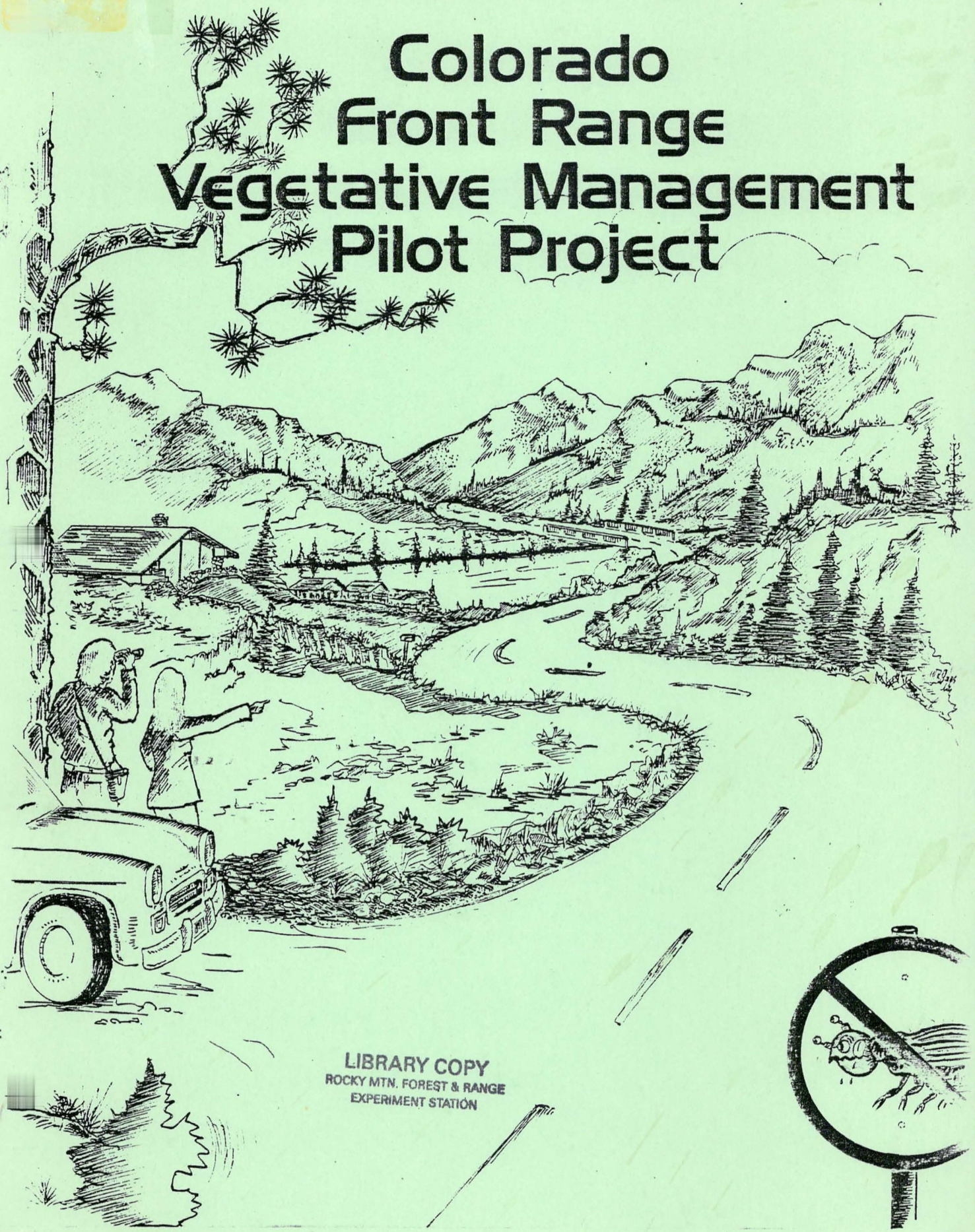
COLORADO FRONT RANGE VEGETATIVE MANAGEMENT PILOT PROJECT BUDGET PROPOSAL

United States Forest Service

Budget Proposal for the

Colorado Front Range Vegetative Management Pilot Project



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COLORADO FRONT RANGE

VEGETATIVE MANAGEMENT

PILOT PROJECT

BUDGET PROPOSAL

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SUMMARY

This is a budget proposal for a pilot application of research results to maintain and protect high recreational values on 34,000 acres of private, Federal and local government lands within Boulder County, in Colorado. The pilot project will consist of a number of intensively applied treatments which will be completed in FY 1978. Evaluation of these treatments on a continuing basis will provide guidance to improve the full scale (585,300 acres) Colorado Front Range Vegetation Management Project. The pilot project will determine the generality of research results on an operational scale, demonstrate the applicability of proposed activities, evaluate the effects of alternate treatments and provide opportunities to improve the cost effectiveness of vegetative management in the rapidly urbanizing mountain zone of the Front Range of Colorado.

Direct control has been used effectively by the Colorado State Forest Service in DCA's (Designated Control Areas), four of which are located within the pilot project boundaries. Vegetative manipulation resulting in basal area reduction has been shown to be effective for mountain pine beetle control. Thinning will be applied to reduce basal area so esthetic and wildlife resources are also enhanced. A research team from the Rocky Mountain Station will help design and evaluate specific activities on the pilot project site to quantify changes in esthetics, protection from beetles and wildlife habitat. This quantification will lead to improved prescriptions and management guidelines for mixed-age class ponderosa pine forests.

Fire hazard reduction is projected for the entire area as a result of improved access, fuel reduction, and fuel break construction. The mixed ownership, heavy population, and high recreational value of lands within the pilot project area, coupled with a low wood product value, create a unique opportunity to study the economics of fire protection and fuel reduction in the Colorado Front Range. The research team will conduct before-and-after treatment studies of the fire hazard to quantify fire potentail and assess changes resulting from various treatments. The costs and benefits of alternative investments will also be evaluated.

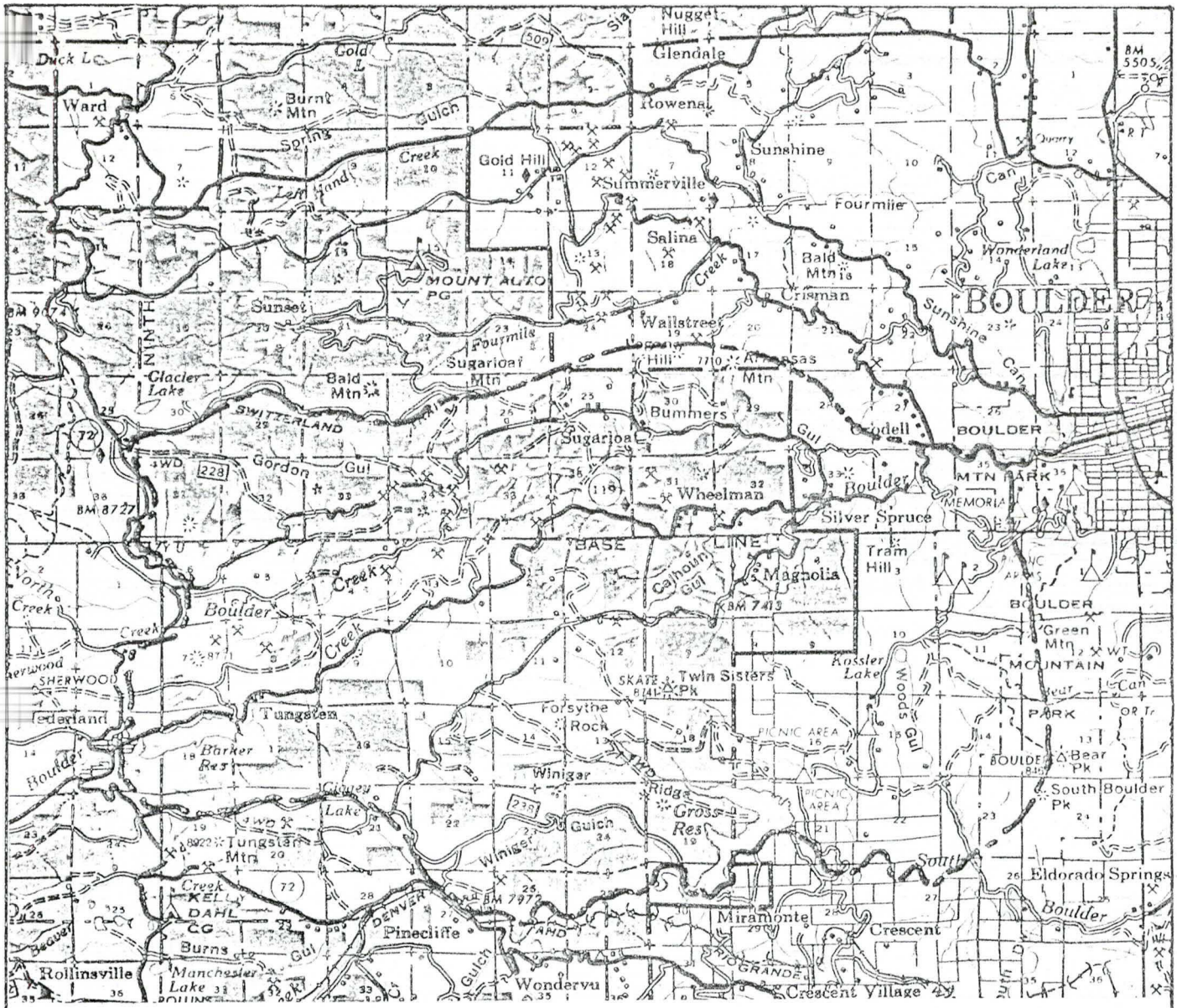
The benefits and costs of three alternative approaches to forest management in the 34,000 acres of front range identified have been analyzed. The proposed pilot project is shown to be the most economically efficient of the alternatives.

Detailed information describing the physiological, social and biological attributes of this pilot area are discussed in the Environmental Analysis Report.

Project costs are summarized as below:

SOURCE	FUNDS
State	$ 250,478
Private (includes labor and equipment provided by landowners)	248,274
Forest Service - USDA	3,332,743
Local Government	51,943
Manpower Program	457,889
TOTAL	$4,341,327

Post-treatment evaluation, to guide the full scale project, will require continuation of annual research funding ($600,000) for four subsequent years.



LEGEND

- Pilot Project Area Boundary
- National Forest Boundary
- County Boundary Line
- Paved Road
- All Weather Road
- Dirt Road
- 4WD Primitive Road and Four Wheel Drive Road
- Trail
- Railroad Tunnel
- Recreation Site
- Recreation Site other than Forest Service
- Roosevelt National Forest Land
- BLM Land
- State Land (permission required to enter)

COLORADO FRONT RANGE VEGETATION MANAGEMENT PILOT PROJECT AREA MAP

SITE SELECTION

The pilot project area consists of approximately 34,000 gross acres lying west of the Flatirons of Boulder, north of South Boulder Creek, east of the Peak to Peak Highway (Colorado 72) and south of a line running along the mountain tops from Glacier Lake to Sugarloaf Mountain, and then to Boulder Canyon. See Map preceeding page.

This area was chosen as a pilot project as it is typical of the intermixed land ownership found in the ponderosa pine forest of the Front Range of Colorado. The area includes lands administered and/or owned by governments and private landowners as follows:

Ownership	Unit
Bureau of Land Management	600
Denver Water Board	1,200
City of Boulder	800
Boulder County	4,300
City of Nederland	160
National Forest	12,127
Private	15,073
TOTAL	34,260

There are sixteen plotted and developed subdivisions within boundary and four Designated Control Areas (DCA) for mountain pine beetle (MPB) control. In response to public interest, the United States Forest Service, Colorado State Forest Service, and Boulder County have completed the first stages of a forest management and wildfire hazard reduction demonstration area on over 200 acres in one of the most highly populated, densely forested, subdivisions. Several landowners' associations have demonstrated interest in forest management practices, as have the cities of Denver and Boulder. A detailed Forest Management Plan was completed in April 1977, by the Colorado State Forest Service for 6,000 acres within the boundaries, under a General Forestry Assistance project.

Boulder County Planning Department has compiled land use information for five mountain subregions within the pilot project area. This data is summarized as Table 1, in the Appendix. The Bureau of Land Management has submitted a budget proposal for direct control and vegetative management of their lands along the Front Range. They also have an ongoing program of thinning. A small portion of the Bureau of Land Management's program will occur within this pilot project boundary.

Another consideration for choosing this area for the pilot project is the high recreational use the area receives. It is highly visible from both highways and from the air. Cooperation among agencies and landowners in the area is excellent. A severe fuel buildup is aggravated by the mountain pine beetle (MPB) devastation, and thousands of acres of living timber and watershed are presently threatened by both MPB and wildfire.

Table 2, in the Appendix, shows a detailed summary of vegetative types, size class, slope and ownership. Below are the major management condition categories and acreages presently defined.

Management Condition Categroy	Acreage Total	Federal 1/	Private and Local Government
I MPB infested (heavily infested)	7,880	1,921	5,959
II Currently under management	150	66	84
III Stands other than ponderosa pine not susceptible to MPB	6,640	3,333	3,307
IV Threatened by MPB (includes areas of light to moderate MPB infestation)	14,050	5,429	8,621
V No treatment planned 2/	3,370	1,340	2,030
VI Nonforested	2,170	638	1,532
Total project area	34,260	12,727	21,533

1/ Includes Forest Service and Bureau of Land Management.

2/ No treatments are planned on rocky ridge tops or in scattered stands with very low densities.

The above average figures depict the situation on the total ownership within the pilot project area. It is expected that owners of about 75 percent of the private land acres will participate in the project. Budget estimates and acres for the private land are based upon this 75 percent factor. Table 3, in the Appendix, reflects 75 percent of the private land and the costs to treat these acres.

GOALS AND OBJECTIVES

The goal as stated in the Vegetative Management Proposal for the Front Range of Colorado is to achieve a managed, attractive forest.

Broad objectives were established for the Front Range to reach this goal -- to be achieved within five years. They are:

- Stop the current mountain pine beetle epidemic.
- Create stand conditions which will enable prevention of future mountain pine beetle epidemics.
- Accomplish fuel treatment in all stands where preventive treatment for mountain pine beetle is applied.
- Modify stand treatments to create (or maintain) stand diversity for wildlife habitat, apply specific treatments for wildlife habitat improvement, and protect snags needed for wildlife in all treated areas.
- Maintain the scenic quality of the area treated.

The goals of the pilot project are to demonstrate and test, on an operational scale, the effectiveness of management practices designed to achieve a managed attractive forest. To reach these goals, the following objectives have been established to be accomplished in one year:

- Reduce wildfire hazard on 34,260 acres by providing improved fire protection to 18,500 acres, fuel reduction on 17,017 acres, and by constructing fuel breaks on 1,300 acres.
- Improve the scenic quality of the 34,260 acres in the project area through creation of a vigorously managed forest resistant to epidemic mountain pine beetle attacks.
- Create stand conditions which will enable prevention of future insect or disease epidemics, through stand improvement of 13,204 acres, and direct control on 6,515 acres.
- Maintain or improve the recreation opportunities for the area through implementation of all management practices.
- Reestablish acceptable densities of vegetation for wildlife and esthetics on 2,105 acres through seeding of 815 acres, and reforestation of 1,290 acres.

- Improve wildlife habitat through design and application of management practices by seeding wildlife browse and cover species on 815 acres, by providing brush piles on 7,000 acres, and snag protection on 12,127 acres, and thinning dense stands of trees on 11,024 acres.

The following research objectives are established to be accomplished within a 5-year time frame in conjunction with the Colorado Front Range Vegetation Management Project:

- Quantify the social and economic benefits to the public resulting from intensive vegetative management in the mountain zone.

- Evaluate the effects of management practices conducted on an operational scale. Provide refined treatments for continuing management of Colorado Front Range forests.

- Effectively transfer existing and new research information to land managers.

The successful accomplishment of these objectives will substantially improve the abilities of the U. S. Forest Service and other land managers to manage forests in the rapidly urbanizing Colorado Front Range. Moreover, the site specific treatments that evolve as applicable on an operational scale from the pilot study can be transferred to similar ponderosa pine forests throughout the western United States.

The pilot program will be designed to finish all vegetative and other on-the-ground practices within one year. The planned result after one year is a managed, attractive forest available for multiple uses, low in fire hazard, high in wildlife and recreation values, and resistant to insect and disease problems. The research effort, after one year, will result in substantial improvement of the guidelines for treatment of the remaining 500,000 acres of the Front Range. The pilot area will be easily identifiable and be a model area for multiple use management in the populated Colorado Front Range.

ACTIVITIES PROPOSED

A combination of activities will be carried out to accomplish the project objectives.

Specific Management Actions Include:	Unit	Quantity
Reduction of stand density through thinning and removal	Acres	13,204
Direct control, mountain pine beetle		
- Cut and chemically treat, burn or remove	Acres	6,515
Fuel hazard reduction		
- Fuel reduction, pile, burn, chip	Acres	17,017
- Fire protection	Acres	18,000
- Fuel breaks	Acres	1,300
Scenic Quality and Wildlife		
Habitat Improvement.		
- Reforestation by planting including wildlife browse species	Acres	1,290
- Seeding, of wildlife browse and cover species	Acres	815
- Build wildlife brush piles	Acres	7,000
- Protect wildlife snags	Acres	12,127

- Improve current knowledge with regard to the methods and for regeneration in ponderosa pine forests.

Application of the proposed activities shown above will produce the following additional byproducts and benefits:

Transfer of the latest findings from mountain zone research to on-the-ground application, improving professional forest management in the Colorado Front Range.

Protection of the visual quality of the forested area throughout the pilot project area for more than 136,000 annual visitors and about 4,500 area residents.

Improved habitat for bird species which utilize open pine stands (turkey, pine grosbeak, etc.) on 8,000 acres of the total area.

Make wood products, including an estimated 9 MM board feet of lumber, 5,300 cunits of roundwood, and 28,000 cords of fuelwood available for use.

Reduction of fire damage and suppression costs on roughly 34,000 acres.

Improved livestock grazing conditions on about 4,000 acres.

Provide an improved understanding of the opportunities for, and benefits of, forest management of ponderosa pine forests.

Allow a more specific appraisal of the esthetics and recreation potential of treated stands in urbanizing areas.

Increase the ability of land managers to provide cost effective fire protection for the Colorado Front Range.

Protect property values on private lands throughout the pilot project area.

Demonstrate intensive multiple use management on a large area of mixed ownership forested lands of prime scenic, recreational, and wildlife value.

Create a forest management consciousness throughout the pilot project area as well as adjoining areas.

Provide an estimaed 400 person-years of employment.

Specific research activities will involve the establishment of a multidisciplinary team of specialists who will:

- Evaluate the response of users to the esthetic qualities of areas receiving different vegetative treatments.

- Evaluate the response of wildlife on a species specific basis to varying levels of habitat improvement activities.

- Demonstrate the usefulness of thinning in second growth ponderosa pine as a means of mountain pine beetle control.

- Identify site specific parameters which might require modification of thinning prescriptions to increase multiple use benefits.

- Determine utilization potential for the fiber being temporarily removed both from the pilot project area and from the entire Colorado Front Range Vegetation Management Program.

- Quantify the fire hazard reduction resulting from fuel treatment, improved fire access, and fuel breaks.

- Evaluate the economics of fire protection, taking into account presuppression costs, fire readiness costs, and fire fighting costs balanced against values and risk for the Colorado Front Range.

- Appraise the effects of the pilot project with respect to recreation use with special focus on increased accessibility and awareness of the area by post-treatment users.

- Investigate interactions between thinning densities and dwarf mistletoe, root rot, and insect pests.

FUNDING

In order to carry out this project on lands of mixed ownership, funds must come from several sources. Total estimated funding by sources is shown below:

SOURCE	FUNDS
State	$ 250,478
Private (includes labor and equipment provided by landowners)	248,274
Forest Service - USDA	3,332,743
Local Government	51,943
Manpower Program (Contributed)	457,889
TOTAL	$4,341,327

Forest Service - USDA funding will come from a combination of State and Private Forestry cooperative programs, National Forest System functions, and Research, as shown below:

State and Private Forestry		National Forest System		Research
Cooperative Forest Management	$13,600	Timber Stand Improvement	$399,259	
Agricultural Conservation Program	204,984	Commercial Timber Sales	12,800	
Cooperative Fire Protection	785,307	Reforestation	93,311	
General Forestry Assistance	100,940	Stage II Inventory	37,284	
Insect & Disease Control	201,348	Recreation Management	19,844	
ACP and/or I&DC (Funding under review)	202,975	Wildlife Habitat Management	65,107	
		Fire PreSuppression	579,307	
		Soil & Watershed Management	16,617	
TOTAL	$1,509,154		$1,223,589	$600,000

State and Private Forestry and the National Forest System will require a total of $1,632,743 to accomplish the objectives for the pilot project. Research will require $600,000 in FY 1978 in order to initiate the required inventory, study plans, and statistical design for subsequent research. A similar amount is needed for four subsequent years (FY 79-82) for a total research involvement of $3,000,000. To initiate this high priority research, the Rocky Mountain Station proposes to reallocate $250,000 of FY 1978 monies to the Colorado Front Range Pilot Project. However, an additional $350,000 will be needed to establish the program.

This is a budgetary proposal only. Land management objectives, site specific plans, and detailed research plans will determine actual treatments for individual forest stands. Work on site specific plans will start and be completed early in FY 1978.

Work that is planned to be accomplished by NYACC and Title 6 of CETA manpower programs is shown in Table 3. The total funding request has been reduced to reflect this planned accomplishement.

Attainment of the level of accomplishment resulting from these programs is based upon the best estimates of the size and location and availability of these programs. Policy and procedure changes may bring about funding shifts.

Sources of funds to accomplish the various treatments is displayed in the following tables. A description of the individual treatment is found in the Appendix.

REFORESTATION - PLANTING

Source of funds	Ownership/Funds Needed		Total
	Private	National Forest	
Private	$ 42,969		$ 42,969
Agricultural Conservation Program (ACP)	128,906		128,906
USFS - NFS			
Reforestation 033		$ 41,879	41,879
Wildlife 080		6,000	6,000
TOTAL	171,875	47,879	219,754

SEEDING

Source of funds	Ownership/Funds Needed		Total
	Private	National Forest	
Private	$ 13,875		$ 13,875
Agricultural Conservation Program (ACP)	41,625		41,625
USFS - NFS			
Reforestation 033		$ 23,503	23,503
Wildlife 080		4,160	4,160
TOTAL	55,500	27,663	83,163

SITE PREPARATION

Source of funds	Ownership/Funds Needed		Total
	Private	National Forest	
Private	$11,485		$ 11,485
Agricultural Conservation Program (ACP)	34,453		34,453
USFS - NFS Reforestation 033		$ 27,929	27,929
TOTAL	45,938	27,929	73,867

ACP funding for reforestation, seeding and site preparation on private lands is proposed for cost-sharing under the Agricultural Conservation Program (ACP). While the planned treatment is in line with established ACP objectives and priorities, some difficulty is anticipated in securing needed funding at the local level. The amount of funding required would be a major impact on the Boulder County ACP allocation, and competition for funds for forestry (or wildlife) practices vs. agricultural practices is a continuing problem. It may be necessary that a special allocation of ACP funds be made in order to successfully complete this portion of the pilot program.

THINNING

Source of Funds	Ownership/Funds Needed			
	Private	Local Govt.	National Forest	Total
State	$129,480	$ 30,450		$159,930
Private	123,945			123,945
Local Government		33,600		33,600
I&DC and/or ACP (Funding Under Review)	162,025	40,950		202,975
USFS - NFS Timber Stand Improvement 034			$300,339	300,339
TOTAL	$415,450	$105,000	$300,339	$820,789

Potential use of ACP or I&DC funding for thinning on private lands is presently under review. Thinning on non-Federal lands will either be financed from funds appropriated under the Forest Pest Control Act or through the Agricultural Conservation Program. Both require cost sharing with non-Federal funding. The Federal share of this thinning will be either 39 percent of qualifying costs if I&DC funds are used, or a percentage determined by the Federal share of the ACP practice. The estimates above are based on a Federal share of 39 percent. The actual share of the total cost born by the State, local and Federal Government and private landowners may vary depending upon the mix of funds used.

The Forest Pest Control Act makes frequent mention of the need and authorization to prevent forest damage from insects or diseases on all forested lands irrespective of ownership. Thinning of Front Range ponderosa pine stands is the most feasible means of preventing future epidemics of the mountain pine beetle.

STAND IMPROVEMENT - PRODUCT REMOVAL

Source of Funds	Ownership/Funds Needed		
	Private	National Forest	Total
Cooperative Forest Management (CFM)	13,600[1/]		13,600
USFS - NFS			
Timber Sales 031		12,800	12,800
TSI 034		98,920	98,920
TOTAL	13,600	$111,720	$125,320

[1/] Financed at 100 percent as State is overmatched.

Funding for technical assistance to private landowners to carryout the proposed thinning with product removal is proposed under the Cooperative Forest Management (CFM) program (which requires minimum 50 percent non-federal matching). Because the State is currently greatly over matching the federal contribution, no additional matching funds are included in this proposal.

An aggressive program to achieve product removal and utilization will be undertaken. Because of the low value of trees for sawtimber and the limited demand for roundwood, it is not possible or desirable to accomplish more than a very small portion through commercial sales. Thinning of these stands will make products available and an aggressive program of property sales, administrative use (free), and programs for collection of fuel wood for personal use will be used to obtain removal.

FUEL TREATMENTS

Source of funds	Ownership/Funds Needed			
	Private	Local Govt.	National Forest	Total
State				
Private				
Cooperative Fire Protection CM2 1/	$778,275	$ 7,032		$785,307
Local Government		2,343		2,343
USFS - NFS Fire Pre-suppresion (115)			$576,622	576,622
TOTAL	778,275	9,375	576,622	1,364,272

1/ Financed at 100 percent level as State is overmatched. A change in current policy is reflected in this financing.

Funding for fuel treatment on private and non-federal public lands is proposed under the Cooperative Fire Protection (CM2) program. Because State and cooperator contributions to the CM2 program (which requires minimum 50 percent non-federal matching) currently greatly overmatch the federal contribution; no additional matching funds are included in this proposal.

MOUNTAIN PINE BEETLE DIRECT CONTROL

Source of funds	Ownership/Funds Needed			
	Private	Local Govt.	National Forest	Total
State	$50,750	$14,500		$ 65,250
Private	56,000			56,000
Local Government		16,000		16,000
Insect & Disease Control (I&DC)	68,250	19,500	$113,598	201,348
TOTAL	175,000	50,000	113,598	338,598

All direct control of mountain pine beetle on National Forest lands will be financed from funds appropriated under the Forest Pest Control Act. Direct control work on non-Federal lands will be cost shared at either 39 percent Federal Forest Pest Control Act funds and the balance from non-Federal matching funds, or by the following formula: Federal share 50 percent for private ownerships of 500 acres or less; Federal share 33 1/3 percent for private ownerships of over 500 acres or less; Federal share 25 percent for non-Federal public lands. The above funding estimates are based upon a Federal share of 39 percent. The Forest Pest Control Act authorizes expenditure of funds appropriated under this Act for suppression of destructive insects or diseases on all forest lands irrespective of ownership.

WILDLIFE HABITAT IMPROVEMENT

Source of funds	Ownership/Funds Needed National Forest	Total
USFS - NFS		
Wildlife 080	$ 46,550	$46,550
TOTAL	46,550	46,550

SUPPORTING ACTIVITIES

Source of funds	Ownership/Funds Needed Private	Local Govt.	National Forest	TOTAL
State	$17,401	$ 7,897		$25,298
General Forestry Assistance (GFA)	69,600	31,340		100,940
USFS - NFS				
Silvicultural Ex. 037			$37,284	37,284
Visual Mapping 070			2,123	2,123
Cultural Resour. 070			17,721	17,721
Fire Pre-Suppres. 115			2,745	2,745
Wildlife 080			8,397	8,397
Soil & Water Management 090			16,617	16,617
TOTAL	87,001	39,237	84,887	211,125

Support costs for state, private, and local government lands are shown as financed by General Forestry Assistance (GFA) funds on a Federal/state match of 80:20. National Forest System support costs have been assigned to the benefiting Protection and Management (P&M) functions.

Unit costs used to develop this budget proposal are based upon estimates of similar work occurring in other areas. They are average unit costs. Experience may show that savings can be experienced as the actual work is accomplished. In addition, accomplishment planned by manpower programs may exceed present estimates. These savings, if they occur, will be used to accomplish additional acres lying adjacent to the pilot project area.

ALTERNATIVES

Three alternatives were considered and analyzed in developing this budget proposal. They are:

1. To let nature take its course with a minimum of influence by man. No investments would be made in the area to control insects or to reduce hazardous fuels.

2. To continue the current program of beetle control at the present level.

3. To initiate the proposed action.

A detailed description and analysis of these alternatives is contained in the Environmental Analysis Report.

BENEFIT/COST ANALYSIS

The three alternatives and the respective benefit/cost ratio, net present worth, and internal rates of return at a 10 percent interest rate are:

Economic Parameter	Custodial Management	Current Direction	Proposed Project
Benefit/Cost Ratio	.22	1.41	1.89
Net Present Worth (M$)	-258.48	304.55	3098.99
Internal Rate of Return	0	28.66	31.23

Based upon attainment of the stated goals and objectives, the proposed project is the most economically efficient alternative. The cost/ benefit analysis contains detailed information on analysis methods used, estimated costs and benefits received.

APPENDIX

A. General Management Prescriptions.

Table 1 Land Use Information for Five Mountain Planning Subregions

Table 2 Summary Data for Boulder County Pilot Project

Table 3 Summary of Treatments

Table 4 Summary of Prescription Costs

Table 5 Planned Manpower Program Accomplishment

APPENDIX

GENERAL MANAGEMENT PRESCRIPTIONS

To accomplish the goals and objectives, an interdisciplinary team developed broad general management prescriptions applicable to each management condition categroy. These general prescriptions are described below, and will be refined and adapted for specific stands within the project area. Table 4 shows a summary of prescriptions by acres for the management condition categories.

TIMBER STAND IMPROVEMENT - PRODUCT REMOVAL

This practice involves the reduction in stand density of mature to overmature stands. Dead, dying, overmature, high-risk and surplus trees will be removed from the forest to reduce fuel loading, improve esthetics, and utilize material as wood fiber. Removal will be accomplished by commercial sales, property sales, and administrative use (free). Where it is not feasible to remove material from the site by these means, normal slash disposal methods will be employed. Additional slash disposal needed to meet fuel reduction needs are covered under fuel reduction. TSI/product removal on private and municipal lands consists of all work needed to get the area ready for commercial sale or utilization of the material including marking, measurement, etc. This practice differs from the thinning practice in that it takes place on sites where product removal is reasonably assured.

SEEDING

Seeding with herbaceous, coniferous, and grass species will be conducted on sites devoid of vegetation primarily to control wind and water erosion and establish desirable forest and wildlife vegetative habitat. The use of seed drills, broadcast methods, and aerial application will be utilized as necessary.

WILDLIFE HABITAT IMPROVEMENT

Vegetation management for wildlife needs is included in this proposal, in two basic categories: (1) modification of the thinning, harvest, and fuel treatment specifications as needed, and (2) additional specific treatments to improve wildlife habitat.

Creation of wildlife openings will be accomplished in conjunction with the thinning and product removal treatments on both Federal and private lands. Since this will be offset by lighter removals to achieve proper density in other stands, no additional costs are included for creating openings. Browse and legume species for wildlife will be planted within the openings.

It is planned to hand build brush piles (average two per acre) on National Forest lands to improve cover for small mammals and birds on about 7,000 acres. Additional work of this kind will be accomplished where fuel treatment work calls for brush piling, by leaving selected piles unburned.

Identifying and signing snags to be saved for wildlife nests and perches will be done on areas to be thinned and products removed and in mature ponderosa pine stands where snag felling is planned.

SUPPORTING ACTIVITIES

This section describes activities needed to support the vegetation and fuel management work outlined above, to assure coordination and accomplishment of multiple benefits:

Soils and watershed analyses will be conducted on areas where treatment is planned, and specific management recommendations will be developed for protection of soils and watershed values. Cost estimates were based on 1.2 percent of fuel treatment costs, 2.5 percent of product removal, and 0.5 percent of thinning costs.

To assist in determining specific stand treatment needed, a modified Stage II inventory will be made on proposed thinning and product removal areas. Cost estimate is based on $3.00/acre for those acres needing this detailed information.

Visual management inventory and mapping will be completed on the total project area as a basis for developing landscape management recommendations. Cost estimate is based on $ .10/acre.

Cultural resource inventory will be required on those areas where soil disturbance or burning is involved. The surveys will provide a basis for modification of planned treatment as needed to protect cultural values. Cost estimate is based on $1.50/acre.

To provide for detailed planning and coordination of fuel treatment, fuels management needs inventory and mapping will be completed for the project area. Cost estimate is based on $ .15/acre.

To identify specific wildlife needs and to provide coordination in implementing the planned treatment, a wildlife habitat prescription and specific management recommendations will be developed for the total area to be treated. Cost estimate is based on $ .50/acre.

Support costs for state, private, and local government lands are shown as financed by General Forestry Assistance (GFA) funds on a Federal/State match of 80:20.

Fuel Breaks

This practice will consist of reducing the stand density of continuous overdense young stands through cutting of trees to the spacing necessary to contain fire on the ground. Resultant slash will be disposed of by piling and burning, chipping, or lopping and scattering.

Prescribed Burning

Prescribed burning will be conducted in heavily mistletoed areas and areas of high fuel concentration where feasible. Broadcast burning, and piling and burning will be used as appropriate. Burning will cleanse stands of uncontrollable mistletoe, consume unwanted fuels, strengthen the effectiveness of fuel breaks, and prepare the sites for various species of vegetation. Sufficient brush piles will remain for wildlife habitat. Prescribed burning will be followed by seeding or tree planting in some instances. All prescribed burning will be done in accordance with local air pollution controls and local burning regulations. Prescribed burning will be used on some acres where thinning has been accomplished and additional fuel reduction is needed to meet fuel reduction goals.

Site Preparation

Site preparation will be used in conjunction with seeding and planting where an adequate seedbed is not available. The practice will include scarification, mechanical brush chopping, or diversions where erosive nature of the site dictates such practices. Site preparation speeds the process of reestablishing desirable species of vegetation.

Reforestation

Reforestation will be accomplished in areas where the insect epidemic has killed large areas of trees and a natural seed source is not available. It will be accomplished by the planting of seedlings and by seeding. Desired results of reforestation are to maintain and improve the scenic quality, improve wildlife habitat and provide watershed protection benefits. Wildlife browse species will be planted where needed and desirable.

Fire Access

Stands not presently accessible will require at least minimal fire access to provide protection from fire. An overall fire access plan will be devised including public and private ownerships. Cooperative agreements will be drawn and actual clearing of access lanes will be conducted as necessary. Design of the fire access lanes and clearing will be done so as to maximize edge effect for wildlife habitat. Lanes will consist of cleared ways. Construction of roads is not planned.

Monitoring

This practice is record keeping and establishment and maintenance of photo points. Photo points will be established in representative areas of differing treatments. Progress will be recorded from the beginning through accomplishment of the planned treatment. Followup photos and records will be developed as necessary.

Fuel Reduction

Fuel reduction is pruning, windrowing, chipping, piling, burining or removal of flammable material to reduce the quantity, continuity, and size of the fuel. Continuous areas of standing dead material that are a threat will be felled and removed or disposed of on the site. Acres treated will be protected from potentially disastrous wildfire. This practice will be accomplished on areas receiving other treatment such as thinning as well as on acres not otherwise treated. The treatment will also create desirable wildlife habitat and improve esthetics. Some heretofore unused material, such as limbs and tops, will be used for fuel and energy production.

Thinning

Thinning will reduce stand density. Basal area (depending upon site) will be reduced to the growing stock level nedessary to preclude epidemic insect attacks and/or those needed to meet stated goals for the area. Benefits include increased vigor in the residual stand, faster growth, less susceptibility to insect and disease problems, and lower fire hazard by increasing the distance between crowns. Thinning, by allowing more light to reach the forest floor, also increases vegetation available for wildlife food. Water yield is increased because snow and rain are more readily collected in the forest floor instead of lodging in and evaporating from the crowns. In many cases the esthetics of an area are improved by eliminating visual barriers.

Direct Control

Direct control will consist of burning, peeling the bark, chipping, or chemically treating infested trees after they have been felled. Situations where direct control measures may be used are: (1) untreated areas where infested trees pose a threat to management objectives in adjacent stands; (2) DCA's where infested trees will not be removed or the broods destroyed, as part of other treatments; and (3) where green trees felled in various treatments become infested and are a threat to management objectives in surrounding green stands.

The benefits of direct control are the immediate reduction of the number of MPB and a reduction in the number of newly infested trees. These reductions in turn reduce the fire hazard, improve esthetics and maintain property values.

TABLE 1

LAND USE INFORMATION

COMPLETE FOR 5 MOUNTAIN PLANNING SUBREGIONS

COAL CREEK, MAGNOLIA, FLAGSTAFF, NEDERLAND & SUGARLOAF

I. Land Use Statistics

A. Acreage - 38,932

Estimates private - 17,519 (45%)
public - 21,413 (55%)

B. Subdivisions

No.	Acreage	% of Private	# Lots	# Permits	# Vacant	Existing Pop.	Potential Pop.
16	1,967	11%	936	274 (32%)	560 (68%)	670	1,344

C. Settlements

No.	# Residences	Existing Pop.
6	83	542

D. Parcels

# Residences	Existing Pop.	Estimated Vacant	Potential Pop.
510	1,224	636	2,750

TOTAL

# Residences	Existing Pop.	Potential Pop.	
867	2,080	6,164	(add vacant lots x 2.4 + existing pop.)

II. Existing Land Uses - Facilities

A. Recreation Areas - 5

1. Gross Reservoir
2. Barker Reservoir
3. Boulder Falls
4. Boulder Canyon
5. Boulder Mtn. Parks

Highest intensity during summer, i.e., 7000 vehicles per day on an average weekend up Boulder Canyon. Year round use is on the increase.

B. Transportation Corridors - 5

1. Boulder Canyon (Colo. 119)
2. Sugarloaf Road (Colo. 122)
3. Magnolia Drive (Colo. 132)
4. Flagstaff/Gross Reservoir (Colo. 77)
5. Coal Creek Drive (Colo. 72)

- Boulder Canyon running over rated capacity
- Sugarloaf slated for paving by 1981
- Coal Creek major Denver Metro access corridor
- Flagstaff heavily used in summer
- Nederland sited on major crossroad to higher elevation recreation area
- Intensity of traffic in Boulder Canyon collector roads, thereby increasingly saturating lands around Boulder County
- With the exception of Lower Magnolia, access by standard passenger cars to lands is good on primary and secondary roads

C. Fire Protection

Certain areas (N. Boulder Creek, back of Boulder Mountain Parks, south side of Boulder Canyon, upper end of Eldorado Springs Canyon, Winiger Ridge, area east of Nederland and north of Magnolia Road) would be difficult to move vehicles into. Recreastion areas are largely at the foot of these relatively inaccessible areas.

III. Mountain Planning Team Questionnaire Results*
*(based on the 5 subregions as totals - 789 responses)

A. Fire Protection	Forest Management
1) Importance -	
a. none - 37 (4%)	49 (6%)
b. some - 49 (6%)	161 (20%)
c. great - 515 (65%)	503 (64%)
2) Return on Tax Dollar	
a. No - 129 (16%)	256 (33%)
b. No opinion - 228 (28%)	209 (26%)
c. Yes - 291 (36%)	184 (23%)

B. Control of Recreational Uses

1) Yes - 428 (54%)
2) No - 152 (19%)
3) Unsure - 140 (17%)
4) No Opinion - 38 (4%)

Questionnaire

Total

Ranking (15 topics). If "Yes" what needs control?

1	(1)	Off road-vehicles	162
3	(2)	Camping	90
4	(3)	Fires	71
8	(4)	Hunting/firearms	41
10	(5)	Trespassing	23

**C. Federal Land Management Reflecting Local Concerns

(1)	Most of time	55 (16%)
(2)	Some of time	136 (41%)
(3)	None of time	58 (17%)
(4)	No opinion	80 (24%)

** Resident responses only - total 329 residents replied.
This total is not broken into resident, seasonal, nonresident; it can be.

* This total does include those who didn't answer a particular question; therefore the responses to each topic may not = 789.

TABLE 2 SUMMARY DATA[1/] FOR BOULDER COUNTY PILOT PROJECT -- FRONT RANGE VEGETATION MANAGEMENT PLAN.

Stand Size Class/ Type/Stocking	Gross Acres	Private Acres	% Total	Federal Acres	% Total	Slope-80% Acres	Slope -45% Acres	MPB/SBW[2/] Infested	Under Mgmt.	Area Threatened
Sawtimber Sized Stands (9.0" DBH+)										
Ponderosa Pine 9A	10,090	8,960	88%	1,130	12%	3,160	2,400	5,830	10	10,090
Lodgepole 9A	1,130	550	49%	580	51%	340	180	30	-	
Douglas fir 9M&W	50	10	20%	40	80%	-	-	-	-	
Total Sawtimber	11,270	9,520	84%	1,750	16%	3,500	2,580	5,860	10	10,090
Post/Pole Sized Stands (5.0-9.0"DBH)										
Ponderosa pine SM&W	9,050	5,520	60%	3,530	39%	2,320	1,560	4,780	140	9,050
Ponderosa pine 8P	3,620	840	23%	2,780	77%	2,030	1,620	810	-	3,620
Lodgepole 8W	4,520	2,000	44%	2,520	56%	1,530	1,070	-	-	
Lodgepole 8M&P	1,720	980	57%	740	43%	70	50	-	-	
Douglas fir	1,910	1,330	70%	580	30%	930	740	610	-	1,910
Total Post/Pole Sized Stands	20,820	10,670	51%	10,150	49%	6,880	5,040	6,200	140	14,580
Total Forested	32,090	20,190	63%	11,900	37%	10,380	7,620	12,060	150	24,670
Total Nonforested	2,170									
Total Area	34,260									

1/ Data was collected at a forty-acre minimum

2/ MPB - Mountain Pine Beetle; SBW Spruce Budworm

TABLE 3

SUMMARY OF TREATMENTS

	TOTAL TREATMENTS BY OWNERSHIPS						PLAN. ACCOMP. W/MANPOWER PROGRAMS				BALANCE TO FUND					
	TOTAL		Forest Service		Private & Local Govt.		Forest Service		Private & Local Govt.		TOTAL		Forest Service		Private & Local Govt.	
PROPOSED TREATMENTS	Acres	Cost	Acres	Cost	Acres	Cost	Acres	Value	Acres	Value	Acres	Cost	Acres	Cost	Acres	Cost
Reforestation-Planting	1,290	246,195	360	71,820	930	174,375	360	23,940	40	2,500	2,500	219,756	360	47,881	930	171,875
Seeding	815	83,164	260	27,664	555	55,500	0	0	0	0	815	83,164	260	27,664	555	55,500
Site Preparation	1,155	73,868	420	27,930	735	45,938	0	0	0	0	1,155	73,868	420	27,930	735	45,938
Fuel Treatments	17,017	1,141,426	6,866	456,589	10,151	684,537	1,275	84,787	435	27,187	17,017	1,029,452	6,866	371,802	11,111	657,650
Fire Access	18,500	81,470	10,000	45,220	8,500	36,250	0	0	0	0	18,500	81,470	10,000	45,220	8,500	36,250
Fuel Breaks	1,300	253,350	800	159,600	500	93,750	0	0	0	0	1,300	253,350	800	159,600	500	93,750
Wildlife Habitat Imp.	7,000	46,550	7,000	46,550	0	0	0	0	0	0	7,000	46,550	7,000	46,550	0	0
TSI-Product Removal	2,180	1,942,001	1,640	159,600	540	34,600	700	47,880	140	21,000	2,180	125,320	1,640	111,720	500	13,600
Thinning	11,024	992,185	4,926	458,610	6,098	533,575	1,700	158,270	150	13,125	11,024	820,789	4,926	300,339	6,098	520,450
Direct Control	6,515	417,795	2,765	183,420	3,750	234,375	1,100	69,825	150	9,375	6,515	338,595	2,765	113,595	3,750	225,000
Monitor	5,614	7,606	3,161	4 377	2,453	3,229	0	0	0	0	5,614	7,606	3,161	4,377	2,453	3,229
Supporting Activities	0	203,518	0	80,509	0	123,009	0	0	0	0	0	203,518	0	80,509	0	123,009
Acres Not Treated	3,370	0	1,340	0	2,030	0	0	0	0	0	0	0	0	0	0	0
Total Acres & Dollars 1/	26,046	3,741,327	12,127	1,721,889	13,919	2,019,438		384,702		73,187		3,283,438		1,337,187		1,946,251
Private Acres Untreated	6,082				6,082											

1/ Total acres includes all Forest Service, private and local government lands.

2/ Total acres includes all Forest Service, private and local government lands to receive treatment including acres accomplished by manpower programs.

TABLE 4.

SUMMARY - PRESCRIPTION COSTS FOR BOULDER COUNTY PILOT PROJECT - FRONT RANGE

VEGETATION MANAGEMENT BUDGET PROGRAM

PROPOSED TREATMENT	ACRES TO BE TREATED						COSTS IN DOLLARS		
MOUNTAIN PINE BEETLE INFESTED	Total Acres	Forest Service	Private	Treatment and Acres	Fed.	Pvt.	Federal Lands	Private Lands	Total $
Sawtimber (9.0" DBH +)									
Ponderosa pine	3,495	538	2,957	a) Seeding	60	330	$ 6,379	$ 33,000	$ 39,379
				b) Salvage Harvest	400	400	31,820	10,000	41,920
				c) Prescribed burn	120	660	7,980	41,250	49,230
				d) Site preparation	60	330	3,990	20,625	24,615
				e) Reforestation	120	660	23,940	123,750	147,690
				f) Fuel Reduction	400	1,793	26,600	112,063	138,663
				g) Fire Access	538	1,784	2,432	7,618	10,050
Lodgepole pine	0			h) Wildlife Hab. Imp.	538		3,578		3,578
Douglas fir	0			i) Thin	100	1,000	9.310	87,500	96,810
Post/Pole Trees (5.0"-9.0" DBH)									
Ponderosa pine 8 M & W	2,550	1,200	1,350	a) Seeding	200	225	21,265	22,500	43,765
				b) Salvage Harvest	400	200	31,920	5,000	36,920
				c) Prescribed burn	400	450	26,600	28,125	54,725
				d) Site preparation	200	225	13,300	10,463	23,763
				e) Reforestation	200	225	39,900	42,188	82,088
				f) Fuel Reduction	800	900	53,200	56,250	109,450
				g) Fire Access	1,200		5,424		5,424
				h) Wildlife Hab. Imp.	1,200		7,980		7,980
				i) Thin	600	850	55,860	74,375	130,235
Ponderosa pine 8P	340	160	180	a) Site preparation	160	180	10,640	11,250	21,890
				b) Reforestation	40	45	7,980	8,438	16,418
				c) Fuel Reduction	160	180	10,640	11,250	21,890
				d) Fire Access	160		723		723
				e) Wildlife Hab. Imp.	160		1,064		1,064
Lodgepole pine	0								
Douglas fir	0								
TOTAL	6,385	1,898	4,487				$402,625	$705,645	$1,108,270

TABLE 4

SUMMARY - PRESCRIPTION COSTS FOR BOULDER COUNTY PILOT PROJECT - FRONT RANGE

VEGETATION MANAGEMENT BUDGET PROPOSAL

PROPOSED TREATMENT	ACRES TO BE TREATED						COSTS IN DOLLARS		
	Total Acres	Forest Service	Private	Treatment and Acres	Fed.	Pvt.	Federal Lands	Private Lands	Total $
II CURRENTLY UNDER MANAGEMENT									
Sawtimber (9.0" DBH+)									
Ponderosa pine 9A	10	5	5	a) Direct control	5	5	$ 332	$ 313	$ 645
Lodgepole 9A	0			b) Monitor	5	5	7	7	14
Douglas fir 9 M&W	0								
Post/Pole Timber (5.0"-9.0" DBH)									
Ponderosa pine 8 M&W	120	60	60	a) Direct control	60	60	3,980	3,750	7,730
				b) Monitor	60	60	83	79	162
Ponderosa pine 8P									
Lodgepole 8W									
Lodgepole 8 M&W									
Douglas fir 8									
TOTAL	130	65	65				$4,402	$4,149	$8,551

TABLE 4

SUMMARY - PRESCRIPTION COSTS FOR BOULDER COUNTY PILOT PROJECT - FRONT RANGE

VEGETATION MANAGEMENT BUDGET PROPOSAL

PROPOSED TREATMENT	ACRES TO BE TREATED						COSTS IN DOLLARS		
	Total Acres	Forest Service	Private	Treatment and Acres	Fed.	Pvt.	Federal Lands	Private Lands	Total $
III NOT SUSCEPTABLE									
Sawtimber (9.0" DBH+)									
Ponderosa pine 9A	0								
Lodgepole 9A	0								
Douglas fir 9 M&W	48	40	8	a) Fire access	40	8	181	34	215
				b) Harvest	20	0	3,192	0	3,192
				c) Monitor	40	8	55	11	66
				d) Fuel Reduction	40	8	2,660	500	3,160
Post/Pole Timber (5.0"-9.0" DBH)									
Ponderosa pine 8 M&W									
Ponderosa pine 8P	370	308	62	a) Monitor	308	62	425	82	507
				b) Fire Access	308		1,392		1,392
Lodgepole 8W	2,670	1,680	990	a) Fire access	1,680	990	7,594	4,227	11,821
				b) Thin	1,680	990	156,408	86,625	243,033
				c) Monitor	1,680	990	2,318	1,307	3,625
				d) Fuel Reduction	1,680	990	111,720	61,875	173,595
				e) Wildlife Hab. Imp.	1,318		8,765		8,765
Lodgepole 8 M&P	1,432	718	714	a) Fire access	718	714	3,245	3,049	6,294
				b) Monitor	718	714	991	942	1,933
Douglas fir	964	350	614	a) Fire access	350	614	1,582	2,622	4,204
				b) Monitor	350	614	483	810	1,293
TOTAL	5,484	3,096	2,388				301,011	162,084	463,095

TABLE 4

SUMMARY - PRESCRIPTION COSTS FOR BOULDER COUNTY PILOT PROJECT - FRONT RANGE

VEGETATION MANAGEMENT BUDGET PROGRAM

PROPOSED TREATMENT	ACRES TO BE TREATED						COSTS IN DOLLARS		
	Total Acres	Forest Service	Private	Treatment and Acres	Fed.	Pvt.	Federal Lands	Private Lands	Total $
IV. THREATENED									
Sawtimber (9.0" DBH+)									
Ponderosa pine 9A	2,494	384	2,110	a) Harvest	250	1,150	39,900	22,500	62,400
				b) Direct Control	360	1,900	23,882	118,750	142,632
				c) Fuel Reduction	360	1,900	23,940	118,750	142,690
				d) Fire Access	384		1,736		1,736
				e) Wildlife Hab. Imp.	384		2,554		2,554
				f) Thin	100	338	9,310	29,575	38,885
Lodgepole 9A	835	485	350	a) Harvest	150	250	23,940	7,500	31,440
				b) Direct Control	15	10	995	625	1,620
				c) Fuel Reduction	165	60	10,973	3,750	14,723
				d) Fire Access	485	350	2,192	1,495	3,687
				e) Wildlife Hab. Imp.	485		3,225		3,225
				f) Thin	300		27,930		27,930
Douglas fir	0								
Post/Pole Timber (5.0"-9.0" DBH)									
Ponderosa pine 8 M&W	3,700	1,740	1,960	a) Harvest	420	100	67,032	15,000	82,032
				b) Thin	1,320	1,850	122,892	161,875	284,767
				c) Fuel Reduction	1,400	1,570	93,100	98,125	191,225
				d) Direct Control	1,400	1,570	92,876	98,125	191,001
				e) Fire Access	1,740	1,960	7,865	8,369	16,234
				f) Fuel Breaks	435		86,783		86,783
				g) Wildlife Hab. Imp.	1,740		11,571		11,571
Ponderosa pine 8P	1,130	925	205	a) Fuel Reduction	925	205	61,503	12,813	74,326
				b) Direct Control	925	205	61,365	12,813	74,178
				c) Fire Access	925		4,181		4,181
				d) Wildlife Hab. Imp.	925		6,151		6,151
				e) Thin	259		24,113		24,113
Lodgepole 8W	400	250	150	a) Thin	240	140	22,344	12,250	34,594
				b) Fuel Reduction	110	65	7,315	4,063	11,378
				c) Fire Access	250	150	1,130	641	1,771
				d) Fuel Breaks	125		24,938		24,938
				e) Wildlife Hab. Imp.	250		1,663		1,663
Lodgepole 8 M&P	0								
Douglas fir	0								
TOTAL	8,559	3,784	4,755				$867,409	$727,019	$1,594,428

TABLE 4

SUMMARY - PRESCRIPTION COSTS FOR BOULDER COUNTY PILOT PROJECT - FRONT RANGE

VEGETATION MANAGEMENT BUDGET PROPOSAL

PROPOSED TREATMENT	ACRES TO BE TREATED						COSTS IN DOLLARS		
	Total Acres	Forest Service	Private	Treatment and Acres	Fed.	Pvt.	Federal Lands	Private Lands	Total $
V. 1/ EXCLUSIONS									
(Slopes greater than 45%)									
Ponderosa pine 9A	1,000	90	910	a) Thin	45	410	4,190	35,875	40,065
				b) Fuel Reduction	56	100	3,724	6,250	9,974
				c) Fuel Breaks	45	500	8,978	93,750	102,728
				d) Fire Access	90	910	407	3,886	4,293
Lodgepole 9A	180	90	90	a) Fire Access	90	90	407	384	791
Douglas fir 9 M&W	0	0	0						
Ponderosa pine 8 M&W	260	170	90	a) Fire Access	170	90	768	384	1,152
				b) Fuel Break	85		16,957		16,957
				c) Thin	100	60	6,650	3,750	10,400
				d) Fuel Reduction	100	60	6,650	3,750	10,400
Ponderosa pine 8P	420	350	70	a) Thin	252	50	23,461	4,375	27,836
				b) Fuel Reduction		50		3,125	3,125
				c) Fire Access	252		1,139		1,139
Lodgepole 8W	720	400	320	a) Thin	200	150	18,620	13,125	31,745
				b) Fuel Reduction	150	200	9,975	12,500	22,475
				c) Fire Access	400	320	1,808	1,366	3,174
Lodgepole * M&P	50	20	30						
Douglas fir (8)	740	220	520	a) Fire Access	220	520	994	2,220	3,214
				b) Fuel Breaks	110		21,945		21,945
				c) Thin	110	260	10,241	22,750	32,991
TOTALS	3,370	1,340	2,030				$136,914	$207,490	$244,404

1/ This is total acres excluded because of excessively steep slopes.

TABLE 4

SUMMARY - SUPPORTING ACTIVITIES COSTS FOR BOULDER COUNTY PILOT PROJECT

FRONT RANGE VEGETATIVE MANAGEMENT PROPOSAL

ITEM	TOTAL COST	FOREST SERVICE COST	PRIVATE AND LOCAL GOVERNMENT COST
Supporting Activities	$189,848	$72,304	$117,544

TABLE 5

FRONT RANGE VEGETATION MANAGEMENT PILOT PROJECT

PLANNED MANPOWER PROGRAM ACCOMPLISHMENT

Available

Federal = NYACC	100 man-years	=	25,000 man-days
State = Title G CETA	15 man-years	=	3,750 man-days
			28,750 man-days

Job Description	Manpower Man-Days Fed.	State	Productivity A/man-day	Accomplishment Federal Acres	Cost $	State Acres	Cost $
Prescribe burn							
Salvage harvest[1/]	3,500		.2	700	36,000		
Harvest		700	.2			140	16,800
Reforestation	1,500	100	.25	360	18,000	40	2,000
Direct control	5,255	750	.2	1,100	52,500	150	7,500
Fuel reduction	6,250	1450	.2	1,275	63,750	435	21,750
Thinning	8,500	750	.2	1,700	119,000	150	10,500
Overhead					95,452		14,637
TOTAL	25,005	3,750	-	-	384,702		73,187

GRAND TOTAL $ 457,889

1/ Actual job will be a portion of total harvest job: fell, buck, limb, but no haul or centralizing.